ASM-10/8

Short Range Modem

Installation and Operation Manual

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Telecommunication Safety

The safety status of each of the ports on ASM-10/8 is declared according to EN 41003 and is detailed in the table below:

Safety Status	Ports
SELV*	DTE
TNV* operating within the limits of SELV*	Line

SELV = Safety Extra-Low Voltage
TNV   = Telecommunications Network Voltage

Regulatory Information

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning per EN 55022

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Declaration of Conformity

Manufacturer's Name: RAD Data Communications Ltd.

Manufacturer's Address: 24 Raoul Wallenberg St.
                                Tel Aviv 69719
                                Israel

declares that the product:

Product Name: **ASM-10/8**

Conforms to the following standard(s) or other normative document(s):

EMC: EN 55022 (1994)   Limits and methods of measurement of radio disturbance
                                      characteristics of information technology equipment.

                EN 50082-1 (1992)   Electromagnetic compatibility – Generic immunity standards
                                      for residential, commercial and light industry.

Safety: EN 60950 (1992/93)   Safety of information technology equipment, including
                                      electrical business equipment.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low
Voltage Directive 73/23/EEC. The product was tested in a typical configuration.

Tel Aviv, October 23rd, 1996

Haim Karshen
VP Quality

European Contact: RAD Data Communications GmbH, Berner Strasse 77, 60437 Frankfurt am Main, Germany

Quick Start Guide

Installation of ASM-10/8 should be carried out only by an experienced technician. If you are familiar with ASM-10/8, use this quick start guide to set it up for operation.

Perform the following steps *for both the local and the remote units*:

QS.1 Installing ASM-10/8

Switch and Jumper Settings

Set the ASM-10/8 internal jumpers and switches correctly for the chosen operating mode. Refer to the table below for the possible settings.

⚠️ **Warning**

Make sure that the power cord is disconnected before removing the unit's cover.

Jumper	Possible Settings	Default Setting
SWITCH	EN	EN
	DIS	
2W/4W	4W	4W
	2W	
AGC	ON	ON
	CTRL	
CARRIER	ON	ON
	CTRL	
XMT LEVEL	0 dbm	0 dbm
	-3 dbm	
	-6 dbm	
	-9 dbm	
XMT IMPD	600	
	300	
	150	150
	LOW	

Jumper	Possible Settings	Default Setting
RPF	ON	ON
	OFF	
PIN 18	EN	EN
	DIS	
PIN 21	EN	EN
	DIS	
CHAS GND	CONN	CONN
	DIS	
RCV IMPD	150	150
	300	
	600	
	HIGH	
CTS-DLY	0 msec	
	8 msec	8 msec
	64 msec	
Data Rate	0 – 19.2	
	1 – 14.4	
	2 – 9.6	9.6
	3 – 7.2	
	4 – 4.8	
	5 – 3.6	
	6 – 2.4	
	7 – 1.2	
XMT TIMING	INT CK	INT CK
	EXT CK	
	RCV CK	
	ASYNC	
V.54 DLY	ON	OFF
	OFF	
DIP Switch	S1	For future use
	S2	OFF
	S3	ON (10 BIT)
	S4	OFF (10 BIT)

Connecting the Interfaces

Connecting the Line

➤ **To connect the line:**

1. Connect the transmit pair to the terminals marked XMT.

2. Connect the receive pair to the terminals marked RCV.

3. Connect the ground wire to the terminal designated GND (optional).

Connecting the DTE

➤ **To connect the DTE:**

- Connect the DTE to the DTE connector on the rear panel of ASM-10/8.

Connecting the Power

➤ **To connect the power:**

1. Connect the power cable to the connector on the ASM-10/8 rear panel.

2. Connect the power cable to the mains outlet.
   The unit will be turned on automatically upon connection to the mains.

QS.2 Operating ASM-10/8

Verifying Performance

When data is being transferred, observe that the following front panel LEDs light or blink:

- PWR – On

- TD – Blinks or On

- RD – Blinks or On

- RTS – On

- DCD – On

- TEST – Off.

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ASM-10/8 Installation and Operation Manual

Chapter 1

Introduction

This chapter describes the basic physical and functional features of the ASM-10/8 short-range modem, as well as some typical applications. It discusses the following topics:

- An overview of the modem

- Physical description

- Functional description

- Technical specifications.

1.1 Overview

General

ASM-10/8 is a short-range modem, which operates over unconditioned lines. It can function in full or half-duplex mode with synchronous or asynchronous transmission format. ASM-10/8 has an extended range of up to 28 km (17.4 miles) on 24 AWG wire, and more depending on wire gauge and data rate (see *Table 1-1*). It operates at eight selectable rates ranging from 1.2 kbps to 19.2 kbps.

Versions

The following versions of the modem available:

- **ASM-10/8 standalone unit**

- **ASM-10/8/R**: a plug-in card for installation in the ASM-MN-214 19" hub, holding up to 14 cards.

Power Supply Versions

The power supply options are:

- For the standalone power supply: 100 VAC, 115 VAC; or 230 VAC.

- For the rack main power supply: 100 VAC, 115 VAC; or 230 VAC; or -48 VDC, or 24 VDC.

Applications   The following diagrams illustrate the ASM-10/8 in a variety of configurations:

- Point-to-point applications

- Multipoint applications

- Tail-end for DDS service applications

- Star applications.
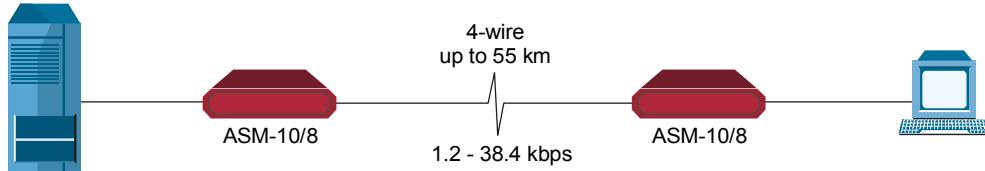
Figure 1-1 ASM-10/8 Point-to-Point Application
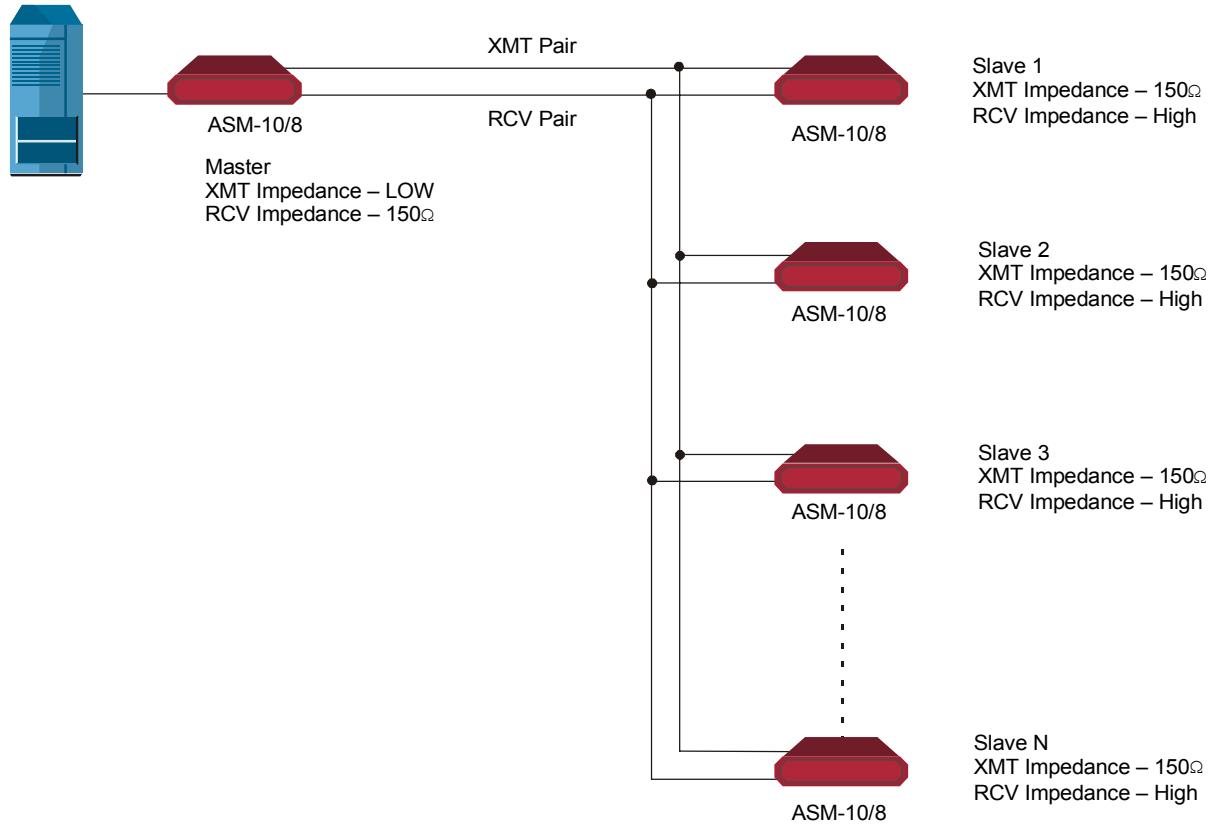
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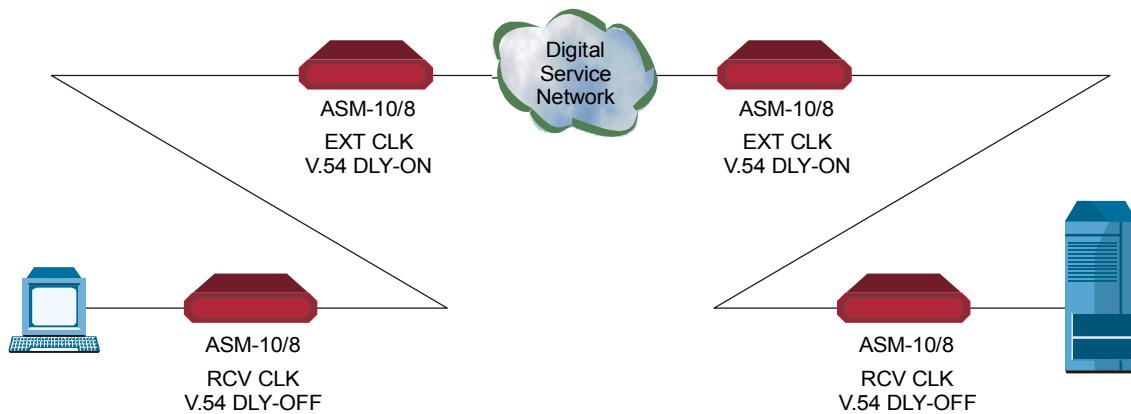
Figure 1-3 ASM-10/8 Tail-End for DDS Service Application
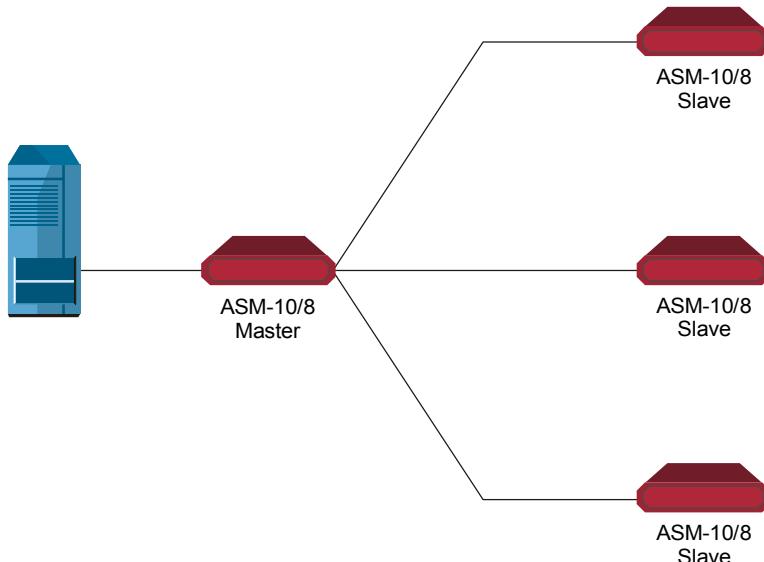
Figure 1-4 ASM-10/8 Star Application

Note	*In the star application, set the XMT and RCV impedance of all the modems to 150W.*

Features

The ASM-10/8 modem uses conditioned differential diphase modulation (EUROCOM Std. D1) to provide protection from background noise, eliminate normal line distortion and permit efficient transmission and reception of serial data over twisted pair cable. ASM-10/8 is connected to the telephone line through isolation transformers which, in conjunction with electronic circuitry, protect the device against AC or DC voltage fluctuations. The protection circuitry permits operation of ASM-10/8 even when DC is connected to the line.

The modem's transmit level and transmit and receive impedances are independently selectable. The transmit timing is either provided internally, or it is derived externally from the data terminal or regenerated from the receive signal. The modem's receive timing is regenerated from the receive signal.

ASM-10/8 communicates over lines in synchronous mode only. When set to the asynchronous mode, ASM-10/8 performs an asynchronous to synchronous conversion in compliance with ITU V.14 bis standard.

The unit has line protection circuits against lightning and power surges.

ASM-10/8 V.54 diagnostic capabilities include:

- Local digital loopback (DIG), activated by the front-panel push button

- Remote digital loopback (REM), activated by the front-panel push button or DTE interface signal, pin 21

- Local analog loopback (ANA), activated by the front-panel push button or DTE interface signal, pin 18.

ASM-10/8 also operates in conjunction with the MCS-10 dual modem card of the MCS-12 Monitoring and Control System.

The ASM-10/8/R card is capable of sensing and indicating power failure on the remote ASM-10/8 standalone unit. When this feature is enabled, the RPF LED lights in case of a remote power failure.

Transmission Range

Table 1-1 lists the ASM-10/8 approximate transmit ranges over 19, 24 or 26 gauge wires.

Table 1-1 ASM-10/8 Transmission Ranges

Speed	19 AWG (0.9 mm)		24 AWG (0.5 mm)		26 AWG (0.4 mm)	
(kbps)	km	miles	km	miles	km	miles
19.2	22.5	14.0	10.0	6.2	7.5	4.7
14.4	24.5	15.3	11.0	6.9	8.2	5.1
9.6	29.0	18.1	13.0	8.1	9.5	5.9
7.2	33.0	20.5	15.0	9.4	11.0	6.9
4.8	36.0	22.5	16.0	10.0	12.0	7.5
3.6	40.0	25.0	18.0	11.2	13.5	8.4
2.4	47.0	29.3	21.0	13.1	15.7	9.8
1.2	55.0	34.3	28.0	17.5	21.0	13.1

1.2 Physical Description

ASM-10/8 is available as a standalone desktop unit or as a card for the ASM-MN-214 hub. *Figure 1-5* shows the 3D view of the ASM-10/8 standalone unit.
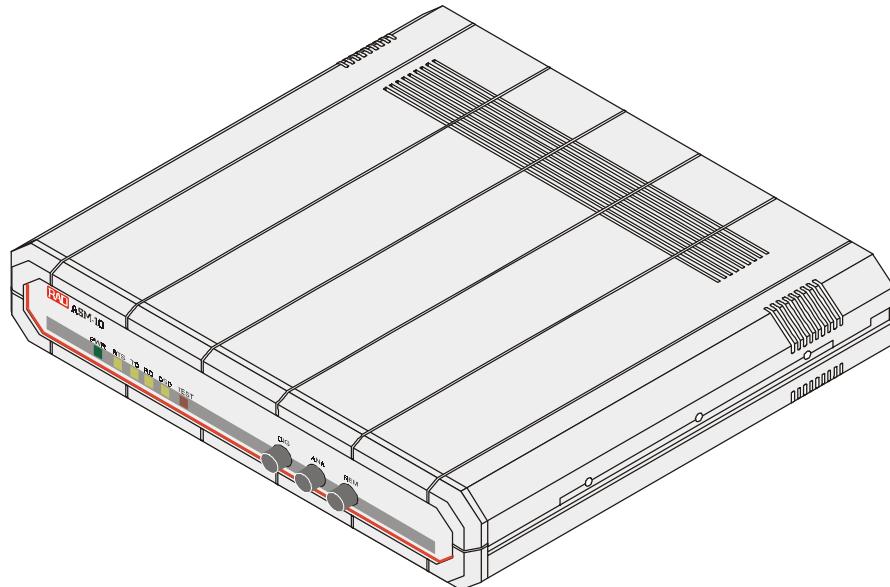
Figure 1-5 ASM-10/8 Standalone Unit

The front panel includes six LEDs, which display the status of power, data flow, control signals and diagnostics. Three front-panel switches control the three loopback modes. For detailed description of the front panel, see Chapter 3, *Operation*.

The back panel includes an AC cord connector with fuse, an interface connector, and a terminal block with a ground connection for connecting the telephone lines. The ASM-10/8 rear panel is described in greater detail, in Chapter 2, *Installation and Setup*.

The internal switches and jumpers can be configured to support a variety of modes for operating the modem. Refer to *Setting the Internal Jumpers* in Chapter 2 for details on jumper location and setting.

1.3 Functional Description

General

This section contains functional descriptions of the circuit blocks of ASM-10/8, primarily those circuits which are required for setting the desired modem configuration (see *Figure 1-6*).

Encoder

The encoder modulates the input data from the DTE using the conditional diphase modulation technique.

The encoder can be configured to operate in one of the following different modes:

- 4-wire full duplex
- 4-wire half duplex
- 2-wire half duplex
- 4-wire multipoint
- 2-wire multipoint.

Modulation Timing

This circuit supplies the transmit clock signal to the encoder.

The following clock sources are available:

- INT.CK (internal clock) – from the modem's internal crystal oscillator)
- EXT.CK (external clock) – from DTE, pin 24
- RCV.CK (receive clock) – recovered from the received signal
- ASYNC – asynchronous timing for working with the async to sync converter in asynchronous applications.

Timing options are selected using the XMT TIMING jumpers.

Async to Sync Converter

ASM-10/8 has an internal asynchronous to synchronous converter (used for asynchronous data).

Asynchronous transmission is provided by internal conversion from asynchronous to synchronous mode in compliance with ITU V.22 bis. In this standard, the modem compensates for frequency deviation between the modem and the DTE by adjusting the length of the stop bit of the async character. If the modem's frequency is higher than the DTE, the local converter extends the stop bit. If the modem's frequency is lower than the DTE, the local converter deletes one stop bit in every four (25%) or eight (12.5%) characters. The remote converter will add a shorter stop bit (shorter by 12.5% or 25%) before sending the data to the remote DTE.

Shortening the stop bits by 12.5% is suitable for frequency deviations up to 1.1% and shortening the stop bits by 25% is suitable for frequency deviations up to 2.3%.

XMT Level and XMT Filter (optional)

Four options are available for the XMT level (signal level): 0, -3, -6, -9 dBm.

An optional output filter for the line is available. This filter complies with Bell 43401 standard and meets British Telecom requirements.

Receiver

The receiver comprises several circuits, as shown in the block diagram, *Figure 1-6*.

- The receive filter removes all the out-of-band frequencies.

- The automatic equalizer comprises several equalizers which are activated according to baud rate.

- The digital AGC automatically compensates for the attenuation of the line.

Remote Power Failure (RPF) Indication

The Remote Power Failure feature notifies the user at a central location of a power failure in a remote modem.

The remote power failure feature can be configured only when the ASM-10/8 standalone unit (remote) operates in conjunction with the rack-mounted card ASM-10/8/R (central). When a power failure occurs, ASM-10/8 standalone unit transmits a special tone, which is detected by the ASM-10/8/R and causes the RPF LED to turn on. A special push button – RPF – located on the front panel of ASM-10/8/R, allows the user to reset the RPF LED. The RPF jumper in the standalone unit enables or disables the feature. RPF should be disabled for multipoint applications.

V.54 Diagnostics

ASM-10/8 features V.54 diagnostic capabilities for performing local analog loopback and local and remote digital loopback. When the modem is set to the digital loopback mode, the operator at either end of the line can test both modems and the line. The loopback is controlled either with front-panel push buttons or via pin 18 and pin 21 of the V.24/RS-232 interface.

A selectable option allows insertion of a delay into the data stream so that the V.54 loops are not carried across the network.

A selectable option allows insertion of a delay into the data stream so that the V.54 loops are not carried across the network. The delay prevents the last modem from receiving the complete V.54 data sequence and, in turn, being induced into the loop. V.54 delay is required only when operating in synchronous mode.

ASM-10/8 Block Diagram

Figure 1-6 shows the ASM-10/8 internal circuitry.
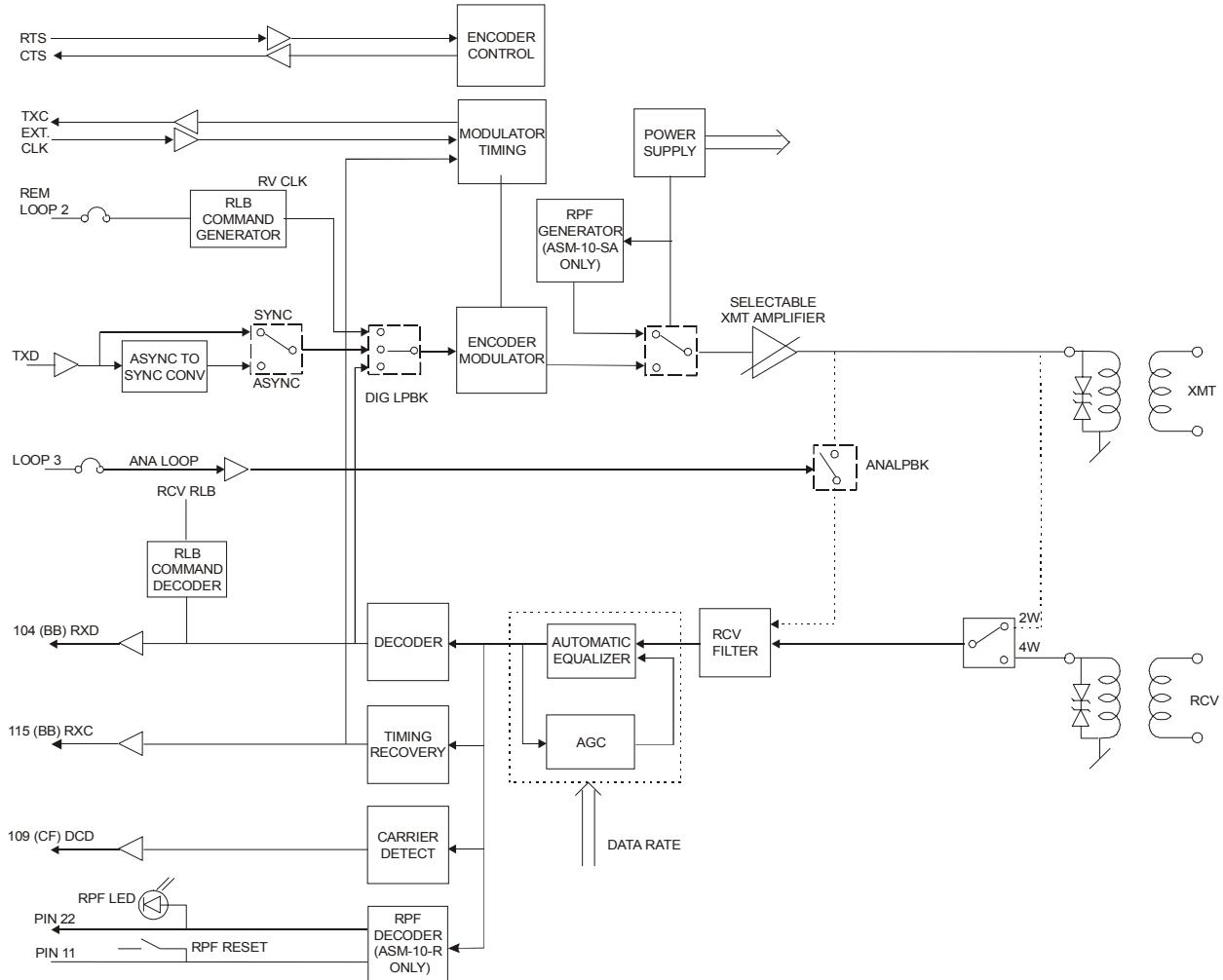
Figure 1-6 ASM-10/8 Block Diagram

1.4 Technical Specifications

Transmission Line	*Type*	Unloaded twisted pair 19 to 26 AWG; 2-wire for half duplex; 4-wire for full duplex
	Connector	5-screw connector or RJ-45
	Range	See *Table 1-1*
	Level	0 dBm, -3 dBm, -6 dBm, -9 dBm
	Transmit Impedance	150, 300, 600Ω, LOW, jumper-selectable
	Receive Impedance	150, 300, 600Ω, HIGH, jumper-selectable
	Return Loss	Greater than 15 dB
	Carrier	Controlled by RTS or constantly ON
	Modulation	Differential diphase (Eurocom Std. D1)
Digital Interface	*Type*	RS-232/V.24
	Baud Rates (Sync and Async)	Selectable to: 1.2, 2.4, 3.6, 4.8, 7.2, 9.6, 14.4, 19.2 kbps
	RTS/CTS Delay	Jumper-selectable to: 0, 8 or 64 msec
	Connector	25-pin D-type female
V.54 Diagnostics	*Digital Loopback*	• Local (DIG), activated by a push button
		• Remote (REM), activated by a push button or by the DTE interface signal, pin 21
	Analog Loopback	Local (ANA), activated by a push button or by the DTE interface signal, pin 18.
Timing Elements	*Receive Clock*	Derived from CDP Receive signal
	Transmit Clock	Derived from the following alternative sources: • Internal • External from the terminal, via pin 24 • Loop clock derived from the receive signal looped back as a transmit clock
Indicators	*TD (yellow)*	Transmit Data
	RD (yellow)	Receive Data
	RTS (yellow)	Request to Send
	DCD (yellow)	Data Carrier Detect
	TEST (red)	Test
	PWR (green)	Power
	RPF (red)	Remote Power Fail (ASM-10/8/R only)

Physical	**ASM-10/8/SA Modem**	
	Height	43 mm / 1.7 in
	Width	215 mm / 8.5 in
	Depth	243 mm / 9.5 in
	Weight	956g / 2.1 lb
	ASM-10/8/R Card	Fits one slot of the ASM-MN-214 hub
Power		110, 115 or 230 VAC (±10%); 47 to 63 Hz
	Power Consumption	3W
	Fuses	• 0.25A/250V (115 VAC) • 0.125A/250V (230 VAC)
Protection	AC/DC overvoltage protection circuits are connected via transformers to transmit and receive lines.	
Environment	*Temperature*	0–50°C / 32–122°F
	Humidity	0 to 90%, non-condensing

Chapter 2

Installation and Setup

This chapter provides the following information for the ASM-10/8 standalone model:

- Site requirements and prerequisites

- Package contents

- Instructions for mechanical installation

- Instructions for electrical installation.

After installing the unit, refer to *Chapter 3* to assure normal operation.

In case a problem encountered, refer to *Chapter 4* for test and diagnostic instructions.

2.1 Site Requirements and Prerequisites

Power

ASM-10/8 should be installed within 1.5m (5 ft) of an easily accessible grounded AC outlet. The outlet should furnish 100-115 VAC or 230 VAC.

- Allow at least 90 cm (36 in) of clearance at the front for operating and maintenance accessibility.

- Allow at least 10 cm (4 in) clearance at the rear of the unit for signal lines and interface cables.

Ambient Requirements

The ambient operating temperature of ASM-10/8 is 0 to 50°C (32 to 122°F) at relative humidity of 90%, non-condensing.

2.2 Package Contents

The ASM-10/8 includes the following items:

- One ASM 10/8 unit (protected by adequate cushioning)

- AC power cord

- ASM 10/8 Installation and Operation Manual.

2.3 Installation and Setup

ASM-10/8 is a standalone device intended for tabletop or bench installation. It is delivered completely assembled. No provisions are made for bolting the ASM-10/8 to the tabletop. For installation of the unit in a 19" rack, refer to *Appendix B*.

➤ **To complete the installation of ASM 10/8:**

1. Determine the required configuration of the modem according to your application, and set the internal jumpers and switches accordingly *(see Figure 2-1* and *Table 2-1*.

2. Connect the line (see *Connecting the Line* below).

3. Connect the DTE interface (see *Connecting the DTE* below).

4. Connect power to the unit (see *Connecting the Power* below).

Setting the Internal Jumpers

This section provides information on the functions of the internal jumpers and switches, to help you in the selection of the correct settings for particular application, and gives you step-by-step instructions for performing the internal settings. The default settings are also listed.

➤ **To set the ASM-10/8 internal jumpers:**

1. Open the ASM-10/8 case.

2. Set the ASM-10/8 internal jumpers and switches, referring to *Figure 2-1*.

3. Reinstall the ASM-10/8 cover.

⚠️
Warning

Access to the inside of the equipment is permitted only to the authorized and qualified personnel.

To avoid accidental electric shock, always disconnect the interface cables and the power cord before removing the unit from its casing.

Line voltages are present inside ASM-10/8 when it is connected to power and/or the lines. Moreover, under certain fault conditions, dangerous voltages may appear on the lines connected to the unit.

Any adjustment, maintenance and repair of the opened instrument under voltage must be avoided as much as possible and, when inevitable, should be carried out only by a skilled technician who is aware of the hazard involved. Capacitors inside the unit may still be charged even after the unit has been disconnected from its source of power.

Caution

ASM-10/8 contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components, and before moving jumpers, touch the ASM-10/8 frame.

Opening the ASM-10/8 Case

To reach the internal jumpers and switches of ASM-10/8, it is necessary to open its case.

➤ **To open the ASM-10/8 case:**

1. Disconnect all the cables connected to ASM-10/8.

2. Turn the unit over (bottom facing up).

3. Unscrew the four cover screws.

4. Turn the unit over (bottom facing down).

5. After the four screws released, remove the ASM-10/8 top cover by pulling it straight up.

Setting the Internal Jumpers and Switches

The internal jumpers and switches located on the ASM-10/8 printed circuit board (PCB) are identified in *Figure 2-1*. Their numbers under heading "Item" in *Table 2-1* correspond to the identification numbers shown in *Figure 2-1*.
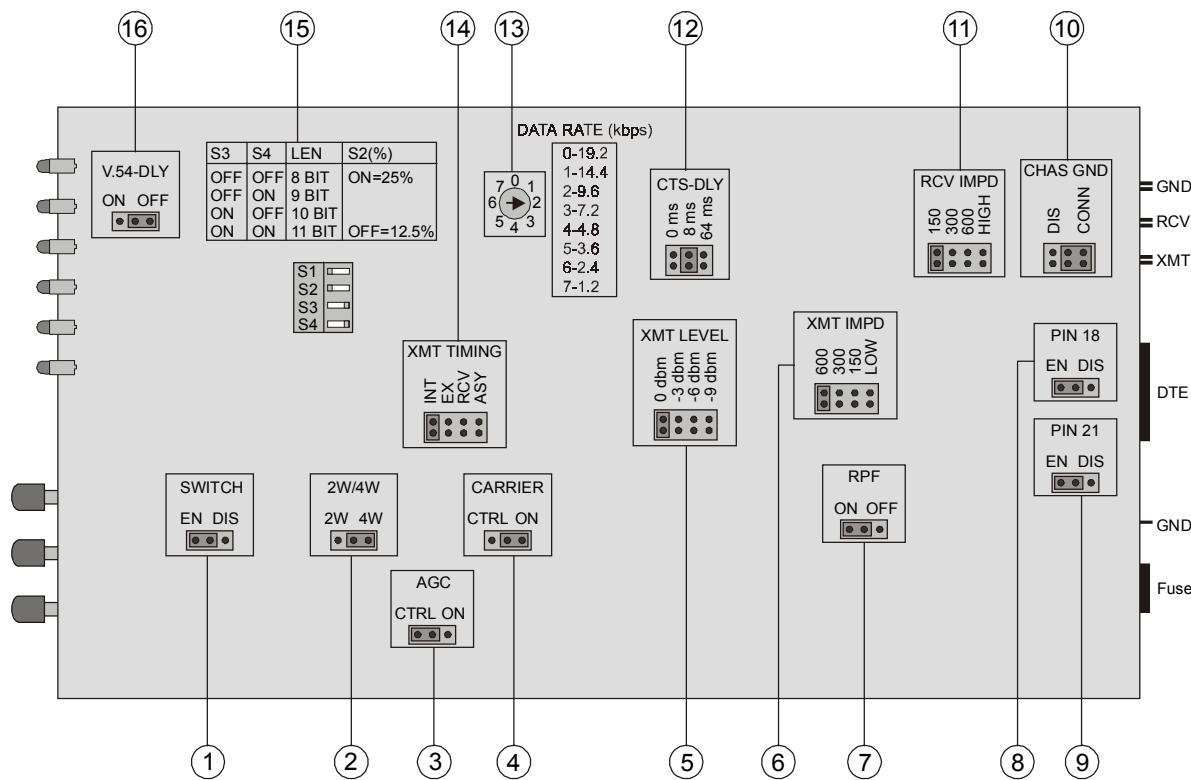

Figure 2-1 ASM-10/8 PCB Layout

Table 2-1 ASM-10/8 Internal Jumpers and Switches

Item	Jumper	Description	Values	Default Setting
1	SWITCH	Enables activation of DIG, ANA and REM loopbacks via the front-panel push buttons	**EN** – The loopbacks can be activated via the front panel	EN
			DIS – The loopbacks cannot be activated via the front panel	
2	2W/4W	Selects 4-wire or 2-wire operation	**4W** – 4-wire operation	4W
			2W – 2-wire operation	

Note: When using 2-wire operation, connect both wires to the XMT screws of the terminal.

3	AGC	Controls the AGC operation.	**ON** – AGC is always active	ON
		Refer to *Configuration Considerations* below for detailed explanation of the AGC settings.	**CTRL** – ACG is active only when DCD turns on	

Note: When set to CTRL, ACG remains at its last level of amplification if DCD goes off.

4	CARRIER	Selects the transmit carrier mode.	**ON** – Transmit carrier is constantly On	ON
			CTRL – Transmit carrier is On only if RTS is high	

Note: Set CARRIER to CTRL when using ASM-10/8 in multipoint applications.

5	XMT LEVEL	Selects the transmit output level to the line	**0 dbm**	0 dbm
			-3 dbm	
			-6 dbm	
			-9 dbm	
6	XMT IMPD	Selects transmit line impedance	**600**	
			300	
			150	150
			LOW	

Note: Set XMT IMPD to LOW when using ASM-10/8 in multipoint applications.

7	RPF	Enables the Remote Power Failure notification (ASM-10/8/R only)	**ON** – RPF notification enabled	ON
			OFF – RPF notification disabled	

Note: Set RPF to OFF when using ASM-10/8 in multipoint applications.

8	PIN 18	Controls the local analog loopback activation via the DTE pin 18	**EN** – The analog loopback activation from the DTE enabled	EN
			DIS – The analog loopback activation from the DTE disabled	

Table 2-1 ASM-10/8 Internal Jumpers and Switches (Cont.)

Item	Jumper	Description	Values	Default Setting
9	PIN 21	Controls the remote digital loopback activation via the DTE pin 21	**EN** – The remote loopback activation from the DTE enabled	EN
			DIS – The remote loopback activation from the DTE disabled	
10	CHAS GND	Controls the connection between the ASM-10/8 signal ground and the frame (chassis) ground	**CONN** – Signal ground is connected to the frame ground	CONN
			DIS – Signal ground is disconnected from the frame ground	

Note: *Disconnecting the signal ground from the frame ground may render the unit unsafe for connection to unprotected telecommunication networks in some locations.*

Item	Jumper	Description	Values	Default Setting
11	RCV IMPD	Selects receive line impedance	**150**	150
			300	
			600	
			HIGH	

Note: *Set RCV IMPD to 150Ω for the master modem and the last modem in the line, and all others to HIGH, when using ASM-10/8 in multipoint applications.*

Item	Jumper	Description	Values	Default Setting
12	CTS-DLY	Selects delay between RTS and CTS. Refer to *Configuration Considerations* below for detailed explanation of the CTS delay settings.	**0 msec**	
			8 msec	8 msec
			64 msec	
13	Data Rate	Selects the data rate	**0 – 19.2**	
			1 – 14.4	
			2 – 9.6	9.6
			3 – 7.2	
			4 – 4.8	
			5 – 3.6	
			6 – 2.4	
			7 – 1.2	
14	XMT TIMING	Selects the transmit timing signal clock source	**INT CK** – Internal clock	INT CK
			EXT CK – External clock	
			RCV CK – Receive clock	
			ASYNC – Async mode	

Table 2-1 ASM-10/8 Internal Jumpers and Switches (Cont.)

Item	Jumper	Description	Values			Default Setting
15	DIP Switch	The DIP switch consists of four sections. The S1 section is reserved for future use.				
	S2	Selects the amount of stop bit shortening to be used in async mode.	**ON** – 25% **OFF** – 12.5%			OFF
	S3, S4	Selects character length in async mode Refer to *Configuration Considerations* below for detailed explanation.	**S3** OFF OFF ON ON	**S4** OFF ON OFF ON	**No of bits** 8 BIT 9 BIT 10 BIT 11 BIT	10 BIT
16	V.54-DLY	Controls the V.54 delay to prevent multiple loopbacks. Refer to *Configuration Considerations* below for detailed explanation of the V-54 delay settings.	**ON** – V.54 delay enabled **OFF** – V.54 delay disabled			OFF

Configuration Considerations

Setting AGC and CTS Delay

The ASM-10/8 receiver consists of the following components:

- The receiver filter, which removes all the out-of-band frequencies.

- The automatic equalizer, which comprises several equalizers activated according to baud rate.

- The digital AGC, which automatically compensates for the attenuation of the line.

The following are general recommendations for the setup position of the AGC and CTS delay:

- For point-to-point applications, set AGC to ON and CTS delay to 8 msec.

- In multipoint or star applications, the AGC and CTS delay settings depend on the distances between the modems (see *Table 2-2* and *Table 2-3*).

Table 2-2 AGC and CTS Delay Settings for Short-Range Applications

Range	Rate	AGC Setting	CTS Delay Setting
Less than 4.5 km 6 km	9.6 to 19.2 kbps 3.6 to 7.2 kbps	CTRL (master and slave)	0 msec (master)
	4.8 kbps		8 msec (slave)
	2.4 to 4.8 kbps		8 msec or 64 msec (slave)
	2.4 kbps and below		64 msec (slave)

Note: The selection between delays depends on the polling environment behavior. Therefore, it is different from application to application

Table 2-3 AGC and CTS Delay Settings for Long-Range Applications

Range	Rate	AGC Setting	CTS Delay Setting
Long or uneven distances between master and slave modems		ON (master and slave)	0 msec (master)
	Above 9.6 kbps		8 msec (slave)
	Below 9.6 kbps		64 msec (slave)

Setting the Async Character Length

Table 2-4 lists the character length values in the asynchronous mode.

Table 2-4 Async Character Length Setting

Start Bit	Data Bits	Parity	Stop Bit	No of Bits
1	5	None	2	8
1	6	None	1, 1.5, 2	8 9
1	6	Odd, Even	1, 1.5, 2	9 10
1	7	None	1, 1.5, 2	9 10
1	7	Odd, Even	1, 1.5, 2	10 11
1	8	None	1, 1.5, 2	10 11
1	8	Odd, Even	1, 1.5, 2	11

Setting the V.54 Delay

When using ASM-10/8 as a tail-end to a DDS network, set the V.54 DLY jumper in the modems located close to the DDS network to ON in order to prevent multiple loopbacks.

Connecting the Interfaces

*Figure 2-2* illustrates the rear panel of a standard ASM-10/8 unit.
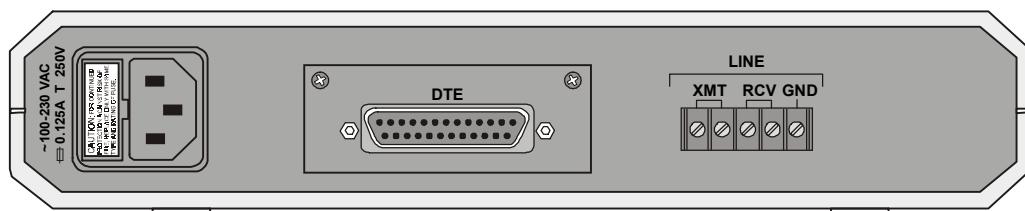
Figure 2-2 ASM-10/8 Rear Panel

Connecting the Line

The line connector is a five-screw terminal block, located on the ASM-10/8 rear panel as shown in *Figure 2-2*. The terminal block provides four screws for connecting the transmit and receive telephone lines and one screw for the ground connection. The transmit and receive pairs are polarity insensitive.

➤ **To connect the line:**

1. Connect the ground wire to the terminal designated GND (optional).

2. Connect the transmit pair to the terminals marked XMT.

3. Connect the receive pair to the terminals marked RCV.

Note   *Use only XMT pair for 2-wire operation.*

Connecting the DTE

The rear-panel DTE connector provides interface for data input/output, clock reference and control signal exchange between ASM-10/8 and the DTE. The DTE connector is V.24/RS-232, D-type 25-pin female connector. Connector pin allocations appear in *Appendix A.*

Connecting the Power

The power is supplied to the ASM-10/8 unit through the 1.5m (5 ft) standard power cable terminated in a standard 3-prong plug. The cable is provided with the unit.

The integral fuse holder, located above the AC socket, contains two fuses (0.125A/250V or 0.25A/250V, slow-blow). The upper fuse is spare and can be used for blown fuse replacement.

⚠

Warning

The unit has no power switch. Operation starts when the power is applied to the rear-panel POWER connector.

Before switching on this instrument, the protective earth terminals of this instrument must be connected to the protective ground conductor of the power cord. The power plug shall only be inserted in a power outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).

Make sure that only fuses with the required rated current, as marked on the ASM-10/8 rear panel, are used for replacement. The use of repaired fuses and the short-circuiting of the fuse holders is forbidden.

Whenever it is likely that the protection offered by fuses has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

➤ **To connect power to ASM-10/8:**

1. Connect the power cable to the connector on the ASM-10/8 rear panel.

2. Connect the power cable to the mains outlet.

    The unit will be turned on automatically upon connection to the mains.

Chapter 3

Operation

This chapter provides the following information for the ASM-10/8 standalone model:

- ASM-10/8 front-panel indicators and controls

- Operating procedires (turn-on, front-panel indications, performance monitoring and turn-off).

Installation procedures given in *Chapter 2* must be completed and checked before attempting to operate ASM10/8.

3.1 Front Panel Controls and Indicators

Figure 3-1 shows the ASM-10/8 front panel. *Table 3-1* lists the ASM-10/8 controls and indicators, located on the ASM-10/8 front panel.


Figure 3-1 ASM-10/8 Front Panel

Table 3-1 ASM-10/8 Front Panel Control and Indicators

Name	Type	Function
PWR	Green	On when power is on.
RTS	Yellow	On when the DTE activates Request to Send.
TD	Yellow	On when steady SPACE is being transmitted. Blinks when data is transmitted.
RD	Yellow	Steady SPACE is being received. Blinks when data is received.
DCD	Yellow	On when a valid receive signal is present.
TEST	Red	On when a test is active.

Table 3-1 ASM-10/8 Front Panel Control and Indicators (Cont.)

Name	Type	Function
DIG	Push button	The DIG (Digital) loopback push button causes the local ASM-10/8 to loop the received data to its transmitter. Data Set Ready (DSR) turns low.
ANA	Push button	The ANA (Analog) Loopback (V.54 loop 3) push button causes the local ASM-10/8 to loop its transmitter output back to its receiver. This loopback may also be activated from the DTE when the PIN 18 jumper is set to EN.
REM	Push button	The REM (Remote) Digital Loopback (V.54 loop 2) push button causes the remote ASM-10/8 to loop received data and clock to its transmitter. Data Set Ready (DSR) goes low. This loopback may also be activated from the DTE when the PIN 21 jumper is set to EN.

3.2 Operating Instructions

Turning ASM 10/8 On

ASM-10/8 is turned on as soon as power is connected. When power is connected, the PWR indicator lights up and remains lit as long as ASM-10/8 receives power.

Normal Indications

If the local and remote ASM-10/8 units are in operation and transmitting/receiving data, the following indicator conditions exist:

- PWR – On

- TD – Blinks or On

- RD – Blinks or On

- RTS – On

- DCD – On

- TEST – Off

If the above LED indications are not obtained following initial power turn-on, check that none of the three test push buttons is pressed. If none of the push buttons is pressed, refer to *Chapter 4* for the diagnostic test instructions.

Turning ASM-10/8 Off

To turn off ASM-10/8, simply remove the AC power cord from the AC source.

Chapter 4

Troubleshooting and Diagnostics

4.1 General

This chapter describes how to perform diagnostics tests on ASM-10/8.

The function of diagnostic tests on ASM-10/8 is to:

* Check that the system is operating normally

* Isolate faulty equipment or cables

* Identify other sources of system malfunction.

Tests are activated by the ASM-10/8 front-panel buttons and monitored via the ASM-10/8 front-panel LED indicators.

4.2 V.54 Loopback Tests

ASM-10/8 supports several types of loopbacks for evaluating the operation of the data system equipment and line circuits. Using these loopbacks, you can test communication between the attached equipment, internal circuitry of the local ASM-10/8 and remote ASM-10/8.

Loopback tests are best performed in the following order:

1. Local analog loopback
2. Remote digital loopback
3. Local digital loopback.

Before testing the operation of the data system equipment and line circuits, ensure that all units are powered up and configured normally. Execute the test procedures in the order shown below.

Local Analog Loopback (LLB)

The Local Analog Loopback (LLB) checks the performance of the local modem, the local data terminal, and the connections between them (see *Figure 4-1*). The test is performed separately at the local and the remote sites.

ANA
Depressed
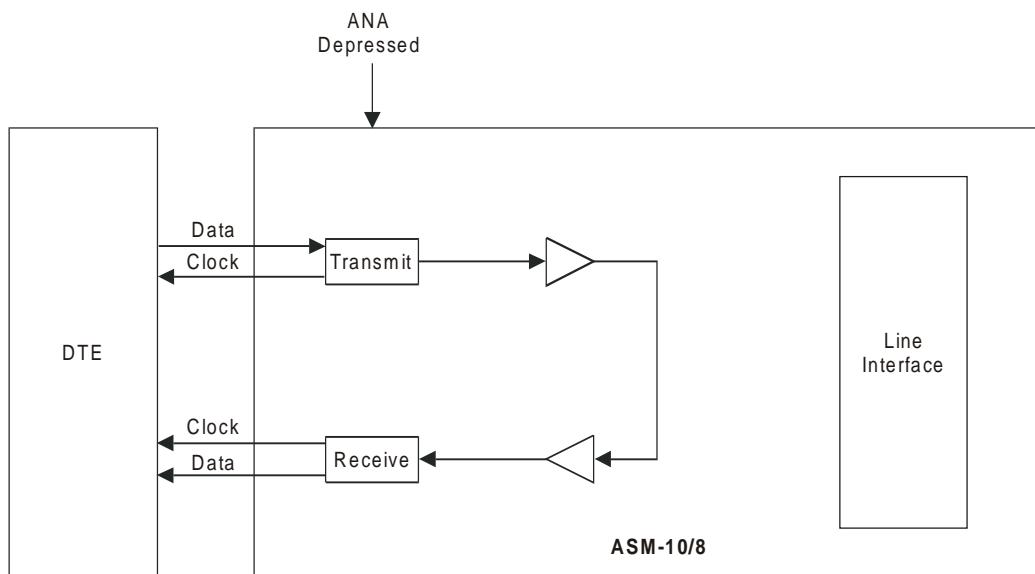
Figure 4-1 Local Analog Loopback

➤ **To perform the Local Analog Loopback test:**

- Push the ANA (Analog Loopback) push button.

    The TEST LED lights up.

Note	*You can also activate the Local Analog Loopback via pin 18 of the DTE interface.*

It is recommended that you repeat the LLB test using external BERT equipment. If the BER test indicates an error-free data stream, but the DTE test indicates a fault, verify that the cable between the DTE and ASM-10/8 is properly connected. If the problem persists, follow the DTE manufacturer's test procedures.

To isolate a communication line problem, perform the LLB loopback at the opposite end. If both LLB tests are error-free, the fault is probably in the communication line or in the line interfaces.

After completing the test or correcting the fault, press ANA button again to restore it the Off position.

Remote Digital Loopback (RLB)

The Remote Digital Loopback (RLB) test checks the performance of the local and the remote ASM-10/8 units and their connecting lines. The Remote Digital Loopback sets a loop at the remote ASM-10/8 unit from the DTE coupled to the local unit (see *Figure 4-2*).
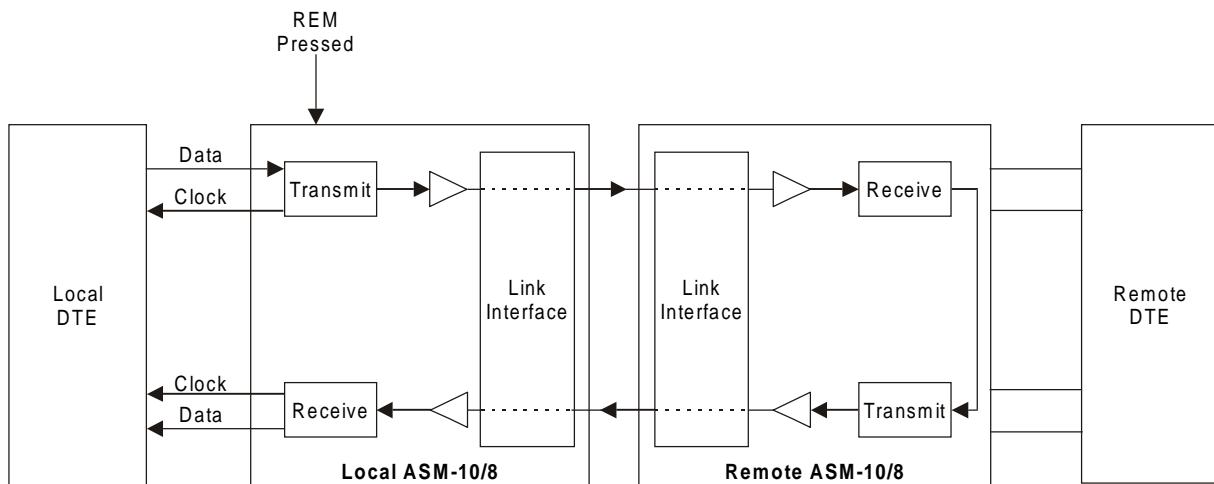
Figure 4-2 Remote Digital Loopback

➤ **To activate the Remote Digital Loopback:**

- Press the REM button on the local ASM-10/8 front panel.

    The TEST LED on each ASM-10/8 front panel lights up.

Note   *You can also activate the Remote Digital Loopback via pin 21 of the DTE interface.*

If the RLB test indicates a fault, but the LLB test was error-free for both local and remote units, then the line or line circuits on either side are not functioning properly.

Local Digital Loopback (DIG)   The Local Digital Loopback (DIG) test allows the operator at the remote end to check the performance of the local and remote ASM-10/8 units, and their connecting lines. The DIG test loops the received data back to the remote ASM-10/8 (see *Figure 4-3*).
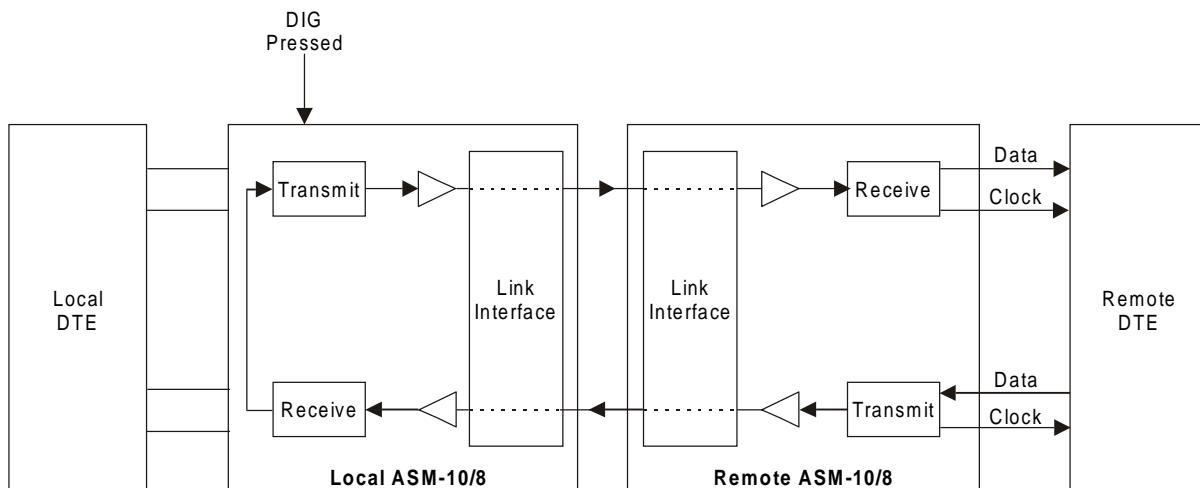

Figure 4-3 Local Digital Loopback

➤ **To perform the Local Digital Loopback:**

- Press the DIG push button on the local ASM-10/8 front panel.

  The TEST LED on each ASM-10/8 front panel lights up.

Chapter 5

Card Cage Version

This chapter describes the ASM-10/8/R card version, designed for installation in the ASM-MN-214 card cage. The chapter contains the following sections:

- **Section 5.1** - describes the ASM-MN-214 card cage.

- **Section 5.2** - describes the ASM-10/8/R card version.

- **Section 5.3** - describes the power supply to ASM-10/8/R.

- **Section 5.4** - describes how to install ASM-10/8/R.

5.1 ASM-MN-214 Card Cage

The ASM-MN-214 card cage contains one or two power supplies and up to 14 plug-in cards. The card types can be ASM-10/8/R or other RAD rack version modems/converters – any combination of up to 14 plug-in cards.

For each of the 14 cards, the rear panel (see *Figure 5-1*) contains a male connector for the terminal block and a DB-25 connector. A protection cover protects the terminal block connectors.

The terminal block (see *Figure 5-1*) is to be attached to the rear panel terminal block connectors. It contains screws for connecting the transmit and receive pairs and ground, if present.

The 25-pin D-type female interface connector provides all interface signals for the digital interfaces.
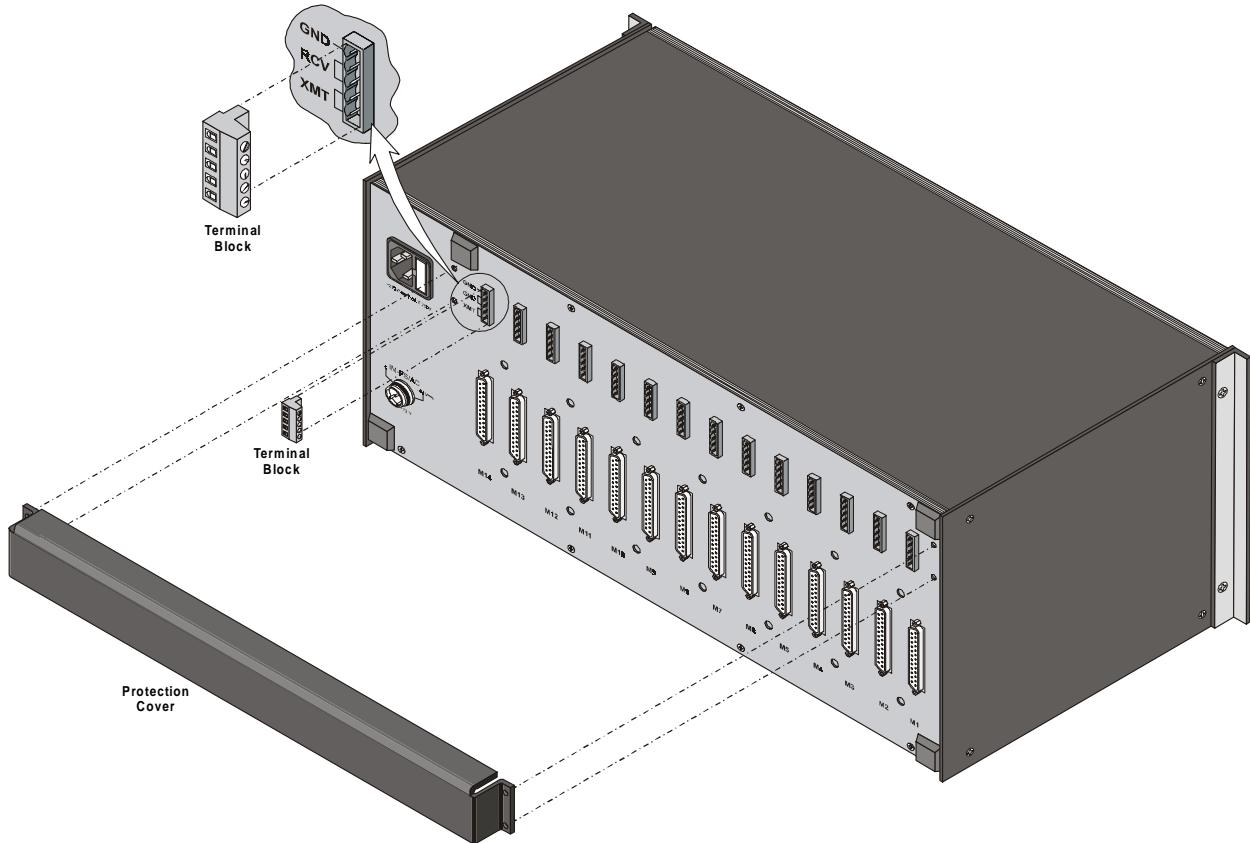
Figure 5-1 ASM-MN-214 Rear Panel

5.2 ASM-10/8/R Card Version

Figure 5-2 shows the ASM-10/8/R card front panel. The LEDs and switches of the card version are almost identical in their functionality to those of the standalone device. For this information, refer to Section 3.1, *Front Panel Controls and Indicators*, in Chapter 3. The ASM-10/8/R front panel features one additional LED indicator (RPF) and one additional push button (RPF).

The RPF (Remote Power Failure) LED turns on when a power failure occurs in the remote standalone ASM-10/8 unit. The RPF push button resets the RPF LED after the power failure.
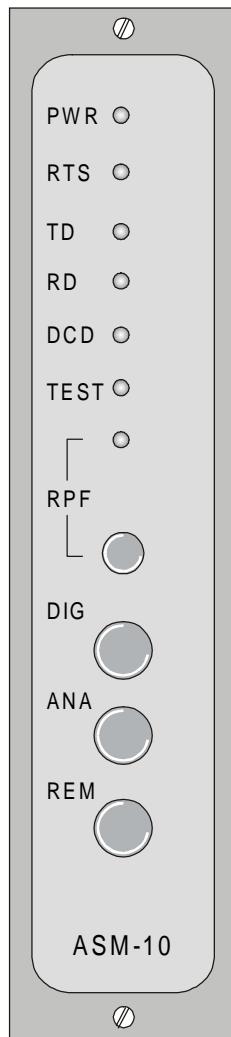
Figure 5-2 ASM-10/8/R Front Panel

5.3 Power Supply

Power is supplied to the ASM-10/8/R card from the ASM-MN-214 power supply via the chassis. Each ASM-10/8/R card has two fuses, which protect the entire system against power failure resulting from a short circuit in one card.

The ASM-MN-214 card cage can accept both AC or DC power supplies. LED indicators located on the ASM-MN-214 front panel (see *Figure 5-3*) show activity when the power supply is connected to the mains plug. The power supply supports the full card cage with any combination of cards.

AC Supply (100, 115 or 230 VAC) — The AC power supply of the ASN-MN-214 is 100, 115 or 230 VAC, ±10%, 50 or 60 Hz.

DC Supply (-48 VDC or 24 VDC) — The DC power supply is -48 VDC (-36 to -72 VDC) or 24 VDC (18 to 32 VDC). It uses a DC/DC converter module to provide the power required for the cards.

Power Supply with Redundancy — This special ordering option is equipped with two separate power supplies, operating together and sharing the load of the whole card cage. If either of the power supplies fails, the other one will continue to supply power to the full card cage.

The activity of each of these two power supplies is indicated by a LED. They should both light when mains power is provided.

Note   *It is possible to combine AC and DC power supplies in the same cage.*
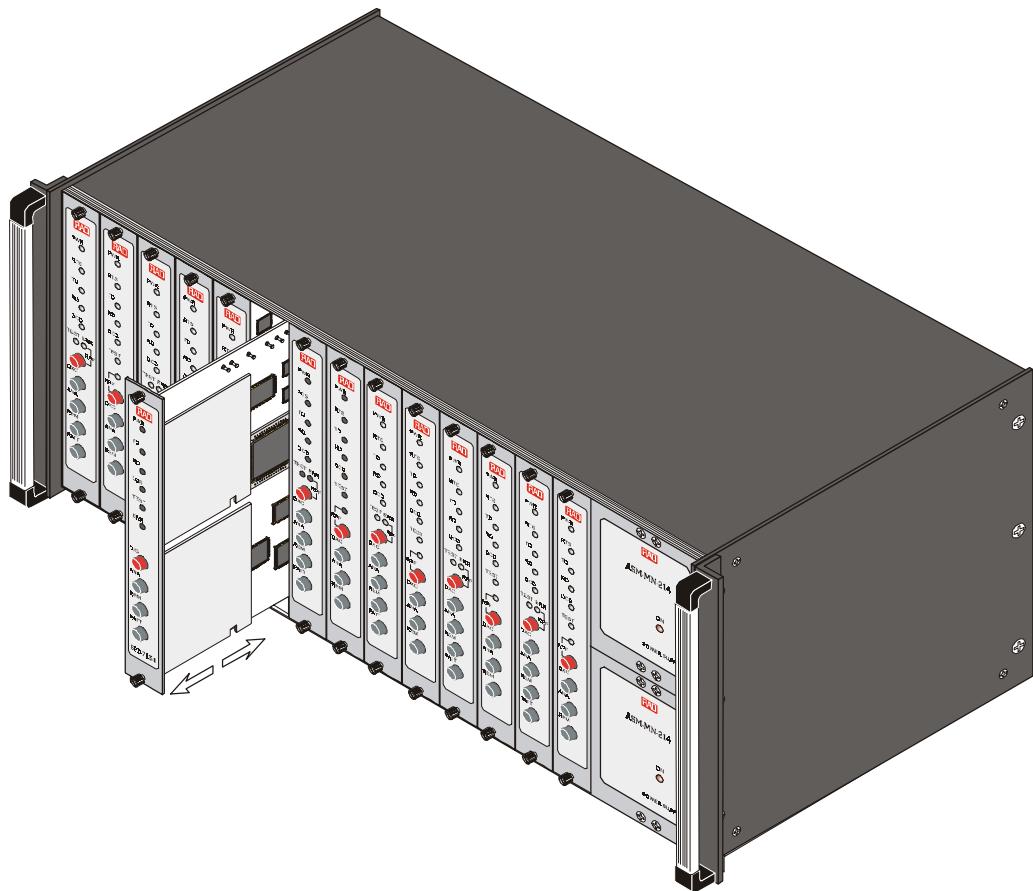
Figure 5-3 ASM-MN-214 Front Panel

5.4 Installation

➤ **To install the ASM-10/8/R card in the ASM-MN-214 card cage:**

1.   Install the ASM-MN-214 card cage in the 19" rack.

2.   Adjust the jumpers and switches on the card as required (see *Figure 2-1* and *Table 2-1* in Chapter 2).

3.   Insert the ASM-10/8/R card into one of the ASM-MN-214 slots. Push the bottom of the card into the cage to until it is fully inserted into the edge connector inside the rack. Tighten the screws on the top and on the bottom of each card.

4.   Remove the protection cover from the terminal block connectors.

5.   Connect the terminal block to the ASM-MN-214 terminal block connector.

6.   Connect the line to the terminal block as follows: connect transmit pair to the terminals marked XMT, the receive pair to the terminals marked RCV, and the fifth screw to ground (optional).

7.   Connect the DTE cable to the DB-25 connector.

8.   Connect power to the ASM-MN-214 card cage:

   •   To connect AC power, connect the power cable to the mains supply.

   •   To connect DC power, refer to *DC Power Supply Connection Supplement* of the ASM-MN-214 manual.

⚠ **Warning**

The ASM-MN-214 card cage has no power switch. Operation starts when the power is applied to the rear panel POWER connector. When applying power, first connect the plug of the power cord to the ASM-MN-214 POWER connector and then to the mains power source (outlet).

Appendix A

Connector Wiring

A.1 DTE Interface Pin Assignments

Table A-1 DTE Interface Pin Assignments

V.24	RS-232	DTE Pin	Signal Identity	Description
101	AA	1	Protective Ground	Chassis ground. May be isolated from Signal Ground (refer to the CHAS GND jumper description in *Table 2-1*).
102	AB	7	Signal Ground	Common signal and DC power supply ground.
N/A	N/A	9 10	+8 volts –8 volts	Output +8 VDC Output –8 VDC
103	BA	2	Transmitted Data	Serial digital data from a terminal or other source. If accompanied by an external data rate clock data, transitions must occur on positive-going transitions of the external transmit output clock.
104	BB	3	Received Data	Serial digital data at the output of the modem receiver. The data transitions occur at the rising edge of the clock.
105	CA	4	Request to Send	A positive level to ASM-10/8 when data transmission is desired.
106	CB	5	Clear to Send	A positive level from ASM-10/8 with selectable delay, after receipt of Request to Send and when ASM-10/8 is ready to transmit.
107	CC	6	Data Set Ready	A positive level from ASM-10/8, power is on and the ASM-10/8 is not in the Local Digital Loopback mode or has not received a Remote Digital Loopback signal from the remote unit.
109	CF	8	Receive Line Signal Detector (Carrier Detect)	A positive level from ASM-10/8, except when a loss of the received input is detected or when Data Set Ready is negative.
113	DA	24	External Trans. Serial Clock	A serial data rate clock input from the data source. Positive clock transitions correspond to data transitions.
114	DB	15	Transmitter Signal Element Timing	A transmit data rate clock for use by external data source. Positive clock transitions correspond to data transitions.

Table A-1 DTE Interface Pin Assignments (Cont.)

V.24	RS-232	DTE Pin	Signal Identity	Description
115	DD	17	Receiver Signal	A receive data rate clock output for use by external data sink. Positive clock transitions correspond to data transitions.
142		25	Test Indicator	A positive control signal output from ASM-10/8 during any test mode.
141		18	Loop 3 Test Command	A control signal input; when on, commands ASM-10/8 into Local Analog Loopback (V.54 Loop 3).
140		21	Loop 2 Test Command	A control signal input; when on, commands ASM-10/8 to send a Remote Digital Loopback command (V.54 Loop 2) to the remote ASM-10/8.
		11	RPF LED Reset	A positive level to the ASM-10/8/R (from management system) resets the RPF LED in ASM-10/8/R.
		22	Remote Power Failure	A positive level from ASM-10/8R when remote power failure occurs.

Appendix B

Installation in 19" Rack

B.1 Installation of the ASM-10/8 Unit in a 19" Rack

General

The height of the ASM-10/8 unit is 1U (1.75"); the width of the unit is slightly less than half the available mounting width. A rack adapter kit, **RM-17**, is available for installing either a single unit or two units side by side in the 19" rack.

Warning

Disconnect AC power before opening the unit.

Installation of a Single Unit

Rack adapter components for installing a single unit include one short bracket and one long bracket.

➤ **To install a single unit:**

1. Fasten each bracket to the side walls of the unit by two screws which are inserted into the two front holes on the side wall. (The unit is supplied with nuts already in place on the inner side wall). Note that the short bracket fastens to the left side of the unit, and the long bracket to the right side of the unit (see *Figure B-1*).

    Once the brackets are fastened to the side walls, the unit is ready for installation in the 19" rack.

2. Place the unit in the rack and fasten the brackets to the side rails of the rack using two screws on each side (not included in the kit).
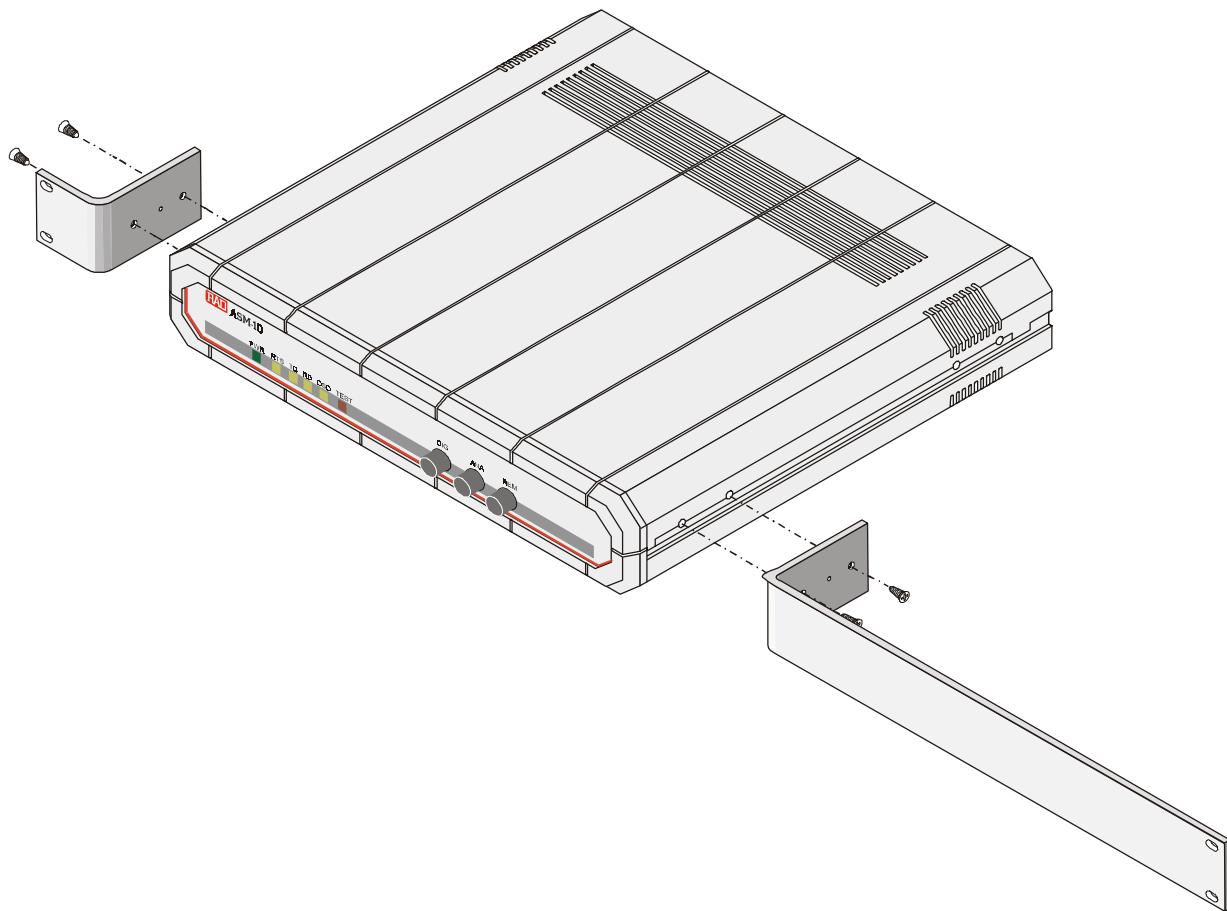
Figure B-1 Installation of a Single Unit

Installation of Two Units

Rack adapter components for installing two units include two long side rails (one for each unit) which slide one into the other fastening the two units together, and two short side brackets which hold the two units in the 19" rack (see *Figure B-2*).
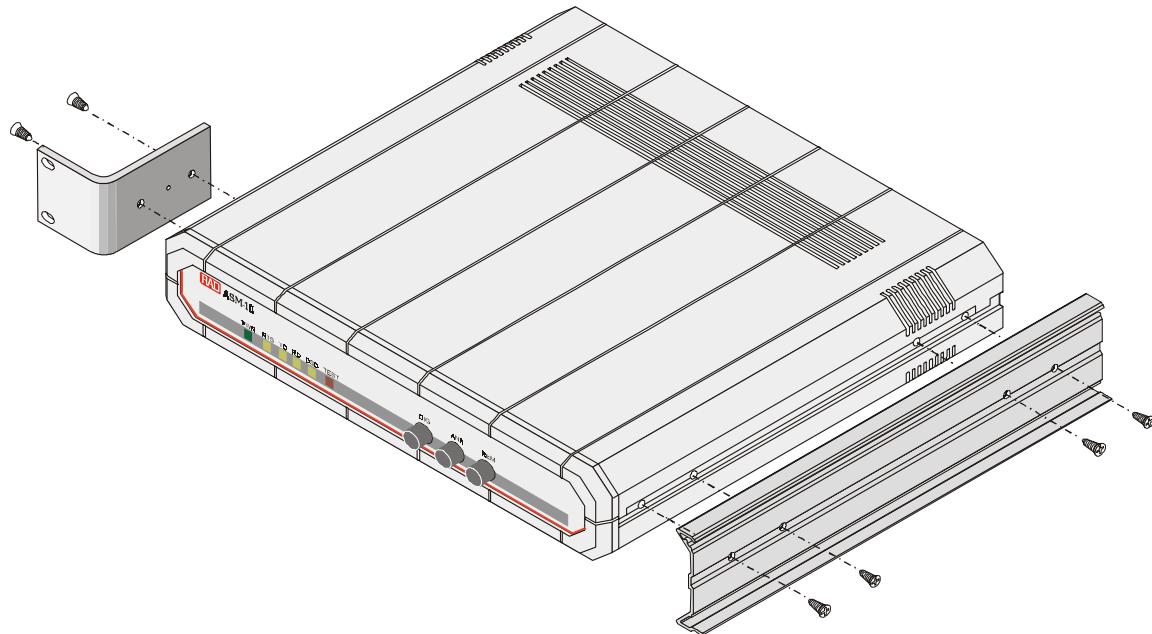
Figure B-2 Installation of Two Units

➤   **To install two units:**

1.   Fasten one long side rail to each unit (right side to one unit, left side to the other unit) using the four screws supplied. The side rails must be attached in opposing fashion, the narrow flange of the first rail opposite the wide flange of the second rail.

2.   Attach one short bracket opposite the side rail on each unit using the 4 screws supplied.

3.   Slide the side rail of one unit into the side rail of the other unit, fastening the two units together (see *Figure B-3*).

4.   Slide the side rail of one unit into the side rail of the other unit, fastening the two units together (see *Figure B-3*). Slide the side rail of one unit into the side rail of the other unit, fastening the two units together (see *Figure B-3*).

The assembled units can now be fastened to the side rails of the 19" rack by means of four screws to each side (not included in the kit).
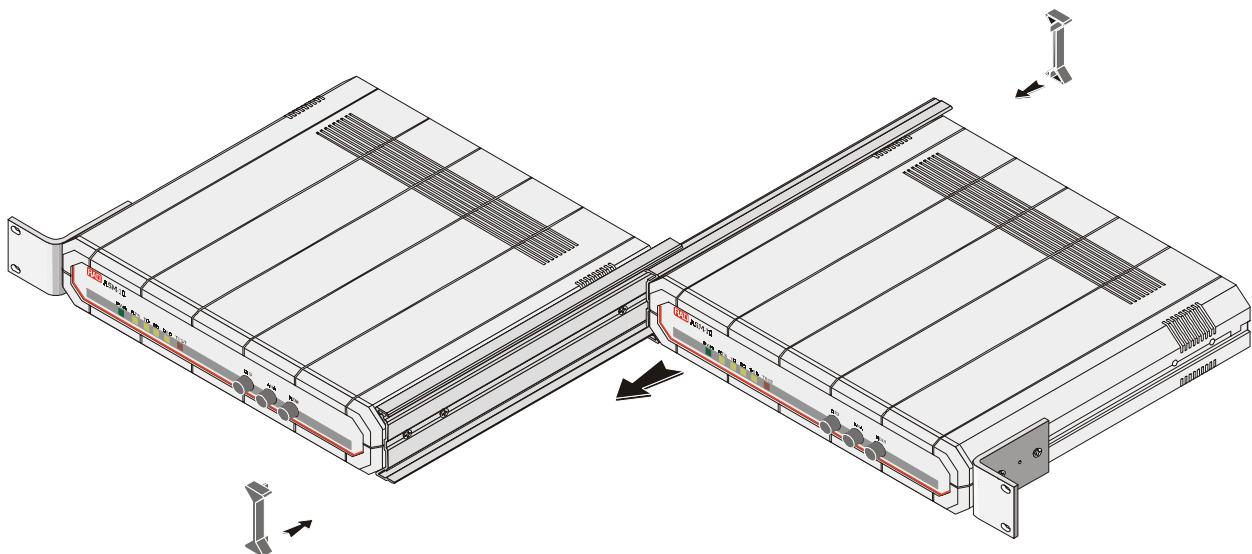
Figure B-3 Fastening Two Units Together